

Spruce and
silver fir.

Of other coniferous forests I will note specially the splendid spruce forests of the Harz, the Thüringer Wald, and Saxony, mixed here and there with Scotch and silver fir, and mostly regenerated by planting, and the silver fir and spruce forest of the Schwarzwald, in the Kingdom of Wurtemberg and the Grand Duchy of Baden, mainly regenerated by self-sown seedlings. The great variety in the rocks and soils of this most instructive mountain range should be noticed. *Gneiss* prevails in the centre on the west side, and is surrounded on three sides, viz., north, west, and south, by an irregular belt of *granite*, and these crystalline rocks are overlaid nearly all round by strata of *red sandstone*, so that in many places, for instance near Rippoldsau, the lower slopes of the valleys consists of *gneiss* or *granite*, while the ridges, spurs, and the high table land between the valleys are composed of *sandstone*. Further east, towards the valley of the Neckar, *muschelkalk* overlies the *red sandstone*. The comparative study of forest vegetation on those different descriptions of soil will be found most instructive. Three distinct systems of management may be studied on the Schwarzwald, each of which has its peculiar advantages according to the circumstances of the forest. In the Wurtemberg State forests the mature crop is removed by a regular series of successive cuttings, extending over a period of from 10 to 15 years, planting being resorted to whenever necessary. The result of this system is a strictly regular gradation of ages; and no forester will visit the districts in the vicinity of Freudenstadt, for instance, the magnificent forest of *Pfalzgrafenweiler*, without admiring the complete and uniform masses of all ages, from the youngest growth to the gigantic stems, which this district produces. A different system is followed in many of the Baden State forests, and in a great portion of the forests on the estates of the Prince of Furstenberg. Here also the mature crop is removed by successive cuttings, but they extend over a much longer period, frequently from 30 to 40 years. The heavier and older timber which is not likely to increase much in value is taken out first, meanwhile the ground gets covered with young growth, mixed with groups of old timber, but still in full vigour; which having got sufficient side room, are increasing rapidly, and when these have attained good marketable dimensions, then they also are cut out successively, so that when the last of the old crop falls, a portion of the young forest has attained a considerable size. The result of this system is necessarily a forest of somewhat less regular character, but it is compact, and the inequality of age which is marked in the young growth gets much less conspicuous as the forest grows older. The third system consists in cutting out the oldest and heaviest timber from all parts of the forest, one compartment after the other being worked in regular rotation. This system (*Femel*, or *Plänterhieb*) is the only safe plan on steep slopes or on rocky ground, where the main object is to keep the ground covered as much as possible, and never to allow a blank, where the soil might get loosened and ravines or torrents formed. Cutting by selection is also the prevailing system in many of the smaller private and communal forests of the Schwarzwald, and something intermediate between this and the second system is found in the large private forests in the valley of the Murg, near Gernsbach (Schifferschaftswaldungen).

Different
systems of
management in
the Black
Forest.

The study of the comparative merits of these three systems will be found highly instructive, and discussions on this subject with the local forest officers will be found most interesting. The effect of storms upon compact masses where the trees have drawn each other up to great lengths, after cutting has commenced, is often extremely destructive, though less so with the silver fir than with the spruce; and experience has shown that forests of a more irregular character, where the old timber has grown up in isolated groups, have greater powers of resistance against winds and storms. On the other hand, the irregular system has many drawbacks. Where the ages are well separated in different compartments, pasture can be permitted without any injury to the forest in the older blocks; but under the irregular system, cattle must either be excluded entirely, or the young growth must suffer. It would lead too far were I here to enter fully into the merits of these different systems. They must be studied on the spot, with the aid of the working plan and of the statistical data showing the results of the working of each system in different forest districts.

Forest legisla-
tion in Wurtem-
berg and Baden.

Those who have time should, while in the Black Forest, make themselves acquainted with the difference in forest legislation and organization of the forest service in both countries. The Kingdom of Wurtemberg has no separate forest law; Baden on the other hand has a most elaborate and, as far as I am able to judge, efficient forest legislation. Special attention should be directed to the provisions which regulate the supervision of private forests, contained in the general forest law of 1833, and modified by the special law of 1854. In this respect forest legislation has in Baden gone further than in most other countries, and some of the provisions are almost as stringent as those of the forest law of the *Canton de Vaud* in Switzerland. Thus, no forest can be rooted up without the sanction of the Forest Department, and no clearing is permitted without sufficient guarantee that the forest will be re-stocked, and if not re-stocked within a certain period, the work may be done by the Forest Department at the proprietor's expense. In the case of small detached forest property, the guards who have the protection of the forest are appointed by the village community to which they belong, and their appointment requires the confirmation of the chief civil officer of the district. These are only a few provisions of a law which deserves careful study, the more so, as it is in force in a country which has for a long series of years enjoyed truly liberal institutions.

Forest adminis-
tration in Wur-
temberg and
Baden.

In the matter of forest administration it should be noticed that in Baden there is at Carlsruhe, the seat of the Grand Ducal Government, a board of councillors, presided over by a director, for the management of forests and other public domains. This board or council is subordinate to the Minister of Home Affairs and the Finance Minister, to each in his own branch, but it has its own defined limits of authority, special matters only being referred to the Ministry. Between this body and the district forest officer there is no intermediate authority; each district, however, is inspected periodically by one of the forest councillors. The entire country is divided into 110 forest districts, and most district forest officers have thus the supervision of communal and private woodlands in addition to the State forests under their charge. The question whether any land comes under the head of forest is settled once for all by the entry in the *Cataster* register. In Wurtemberg, local inspecting officers, each in his division, are placed between the district forest officer and the central authority at Stuttgart. A remarkable institution of that country are the military forest guards. Non-commissioned officers are, as reward of good conduct, appointed forest guards (*Forst Wächter*), without, however, ceasing to